

DCGS-A — Creating the Army's Intelligence, Surveillance and Reconnaissance (ISR) Net-Centric Enterprise System

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My intention is to return the focus where it belongs, to the Soldier struggling to kill or avoid being killed and to his commander struggling to master the remorseless logic of carnage.

— Max Boot, *War Made New (Technology, Warfare and The Course of History)*

DCGS-A V2 has clearly demonstrated its ability to meet tactical challenges on the ground in Iraq providing a range of ISR capabilities to support intelligence requirements for security patrols and peace enforcement, and force-on-force engagements to counterinsurgency/counterterrorism operations. Here, SSG Miguel Ramirez from Charlie Troop, 8th Squadron, 10th Cavalry Regiment, 4th Infantry Division, provides security during a joint presence patrol with Iraqi security force elements near Ameriya, Iraq, last November. (U.S. Army photo by SGT Martin K. Newton, 982nd Signal Co. (Combat Camera).)

The Distributed Common Ground Systems-Army (DCGS-A) is leading the way in providing Future Force capability for today's fight. DCGS-A is the Army's ground portion of a Joint intelligence enterprise that unifies the collection, processing, analysis, extraction, query and visualization capabilities for tactical environments. The efforts in this area will benefit our warfighters by combining the preceding functions along with creating a predictive intelligence analysis environment that enables effective, dynamic battle command.

DCGS-A became reality through the Program Executive Office (PEO) Intelligence, Electronics Warfare and Sensors' (IEW&S') rapid response to Army G-2 acceleration efforts and fielding of an initial DCGS-A capability in theater to meet the most pressing operational needs. This fielded effort, initially called the Joint Intelligence Operations Center-Iraq (JIOC-I), is the DCGS-A Version 2 (V2) capability and has been fully transitioned to the DCGS-A program office. DCGS-A is successfully merging the best capabilities of numerous Current Force systems

with the best emerging technologies, to craft an enduring hardware and software architecture that will be operationally relevant now and for the Future Force. The DCGS-A road map will ease the rapid integration of internally developed innovative ISR capabilities and technologies from Future Combat Systems, our Joint service partners and coalition forces, while minimizing costs from unnecessary rework.

DCGS-A — Leading Transformation Strategy

The DOD and Army transformation strategies are designed to create a more efficient, effective, capable and cost-effective warfighting force. Transformation can be described as the adoption of a strategic vision to harness discontinuous or disruptive technological, organizational and infrastructural changes to increase the agility of U.S. combat power against existing and emerging threats. A critical requirement for Army transformation is an ISR capability that can adjust or scale to match both existing and evolving threats during its life cycle. Clearly, the current war on terror demands an ISR enterprise that can

improve force effectiveness in operations ranging from traditional maneuver force-on-force engagements to nontraditional operations other than war missions, such as humanitarian aid and peace enforcement. The DCGS-A architecture, in its current level of execution, has demonstrated its robustness and ability to meet these challenges as demonstrated by the fielded DCGS-A V2 and soon-to-be-fielded DCGS-A V3 and Human Domain Workstation products.

The vision and architecture laid out for DCGS-A has been flexible enough, both in form and process, to quickly absorb developing capabilities from the theater, the schoolhouse, lab and industry. From a development and architectural perspective, the key lesson learned, while developing the initial DCGS-A capability, is that high-performance enterprise systems are built from a solid internal core and execute a defined strategy to deliver value to the edge points — in this case, our warfighters. The creation of an ISR enterprise, therefore, calls on DOD and the Army to leave behind the existing comfort zones of “stovepipes” and their single-purpose business rules and adopt



The DCGS-A platform provides an ISR capability that is robust, scalable and tailorable to meet both existing and evolving battlefield threats. Here, U.S. Army Soldiers from 3rd Battalion, 7th Field Artillery Regiment, 25th Infantry Division, provide security for Iraqi engineers responding to a major oil pipeline attack by insurgents. (U.S. Air Force photo by SSGT Samuel Bendet, 30th Space Communications Squadron.)

an architectural philosophy and enabling techniques that permit our system to continually adapt, scale and offer new capabilities while remaining economical and efficaciously supporting combatant commanders and their Soldiers on danger's frontiers.

Service-Oriented Architecture (SOA) Encapsulates the Vision

The DCGS-A development is unique, not only within the DOD community, but also within the broader universe of information technology (IT) theory and practice. DCGS-A is based on an SOA that helps define discrete IT software and system service capabilities that are discoverable, invocable and reusable by any other service or end user. While SOAs currently exist in many commercial mission-critical systems, DCGS-A represents their first tactical warfighting implementation within DOD. The Project Manager (PM) DCGS-A was tasked with assisting these existing Programs of Record (PORs) in identifying and distilling their key data assets and analytic capabilities and services, enabling their use in the end-state DCGS-A enterprise.

The POR analysis and distillation process is a critical driver to the

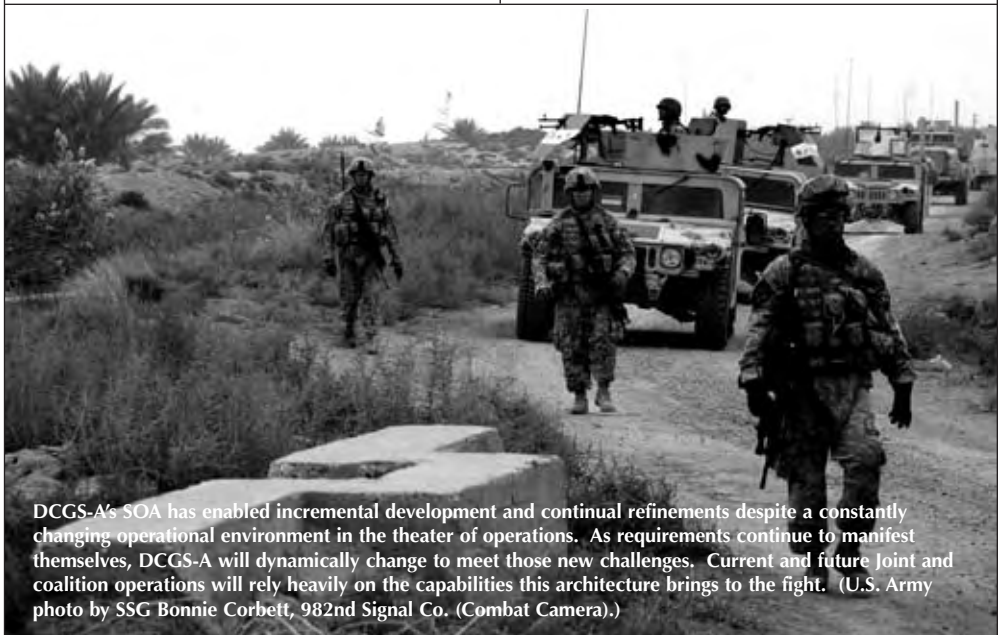
acquisition and sustainment processes that will be used in ongoing DCGS-A development and deployment. The fact that we are currently involved in a war demands that we operate in a flexible manner, balancing prudent design risks against the reward of rapidly providing critical information that can save Soldiers' lives. The development of enterprise information technologies necessitates an acquisition environment that supports situations where it may not be possible for the end user to articulate exact requirements. Our solution to meeting this dynamically changing situation was the implementation

architecture chosen for DCGS-A that easily enables incremental development and continual refinement as the requirements become better defined. The SOA strategy permits us to explore how we could refactor, rather than completely recode, capabilities from the existing services set that would enable us to meet the user-requested capabilities or effects.

The PM DCGS-A created a strategic road map that keeps the transformational end state in sight while addressing significant current needs. The road map outlines a crawl, walk, run model. This means that while the ultimate aim is to create the perfect, fully capable, transformational, net-centric enterprise, it will be accomplished in a stepwise fashion. Our requirement is that the process be reasoned and deliberate with clear warfighter-relevant deliverables along the way. This process allowed us to deploy interim capabilities to the field such as DCGS-A V2 and DCGS-A Fixed without compromising the program's long-term effectiveness.

Implementing the DCGS-A SOA Vision

The first, or "crawl," phase consists of the process of inventorying potential POR services and generating a broad



DCGS-A's SOA has enabled incremental development and continual refinements despite a constantly changing operational environment in the theater of operations. As requirements continue to manifest themselves, DCGS-A will dynamically change to meet those new challenges. Current and future Joint and coalition operations will rely heavily on the capabilities this architecture brings to the fight. (U.S. Army photo by SSG Bonnie Corbett, 982nd Signal Co. (Combat Camera).)

set of specifications to provide guidance to our industry counterparts. These specifications serve as catalysts for lively and pointed discussions that provide a strong theoretical and practical basis for DCGS-A's initial executions.

In addition, the use of prior work done by the U.S. Air Force, specifically the DCGS Integration Backbone (DIB), enabled DCGS-A to make a quick start toward its objective system. DCGS DIB adoption and implementation started us walking on the road to service-enabling Army systems. Initial work on DCGS-A V3 uses the DIB to interface with the Joint MetaData Catalog (MDC). While V3 was being developed, we were afforded the opportunity to assimilate the Joint Intelligence Operations Capability. DCGS-A, like any enterprise system, consists of a wide range of transactional information processing capabilities. These transactional capabilities require an institutional memory repository or warehouse. In the commercial world, a data warehouse is a database geared toward an organization's business intelligence requirements. In the DCGS-A enterprise, the JIOC-I capability served this key function.

The JIOC-I data warehouse ingests data from the various operational systems at regular intervals and distributes mined, analyzed and packaged information across the enterprise. JIOC-I facilitates the analysis of historical operational performance over time, which is needed to refine future operational mission execution. These capabilities were productized and deployed as DCGS-A V2. The assimilation of JIOC-I into the DCGS-A enterprise provided total validation of the PM acquisition approach and the decision to implement an enterprisewide SOA architecture. This was further leveraged through DIB infrastructure integration and a visualization capability called the



DCGS-A V4 will deliver an open and flexible ISR enterprise system when it is fielded. Here, SGT Stephen Cribben leads fellow 561st Military Police Co. Soldiers up a hill to provide area security. These Soldiers are attached to the 10th Mountain Division operating in Parwan Province, Afghanistan. (U.S. Army photo by SFC Dexter D. Clouden, 55th Signal Co. (Combat Camera).)

Multi-Function Workstation (MFW) that permitted integration of the best portions of these programs into our "walk" phase called DCGS-A V3.

V4 Proof of Concept (PoC)

DCGS-A V3 proves that PORs can be successfully integrated in a loosely coupled, nonproprietary, incremental manner. DCGS-A V3 includes functionality from JIOC-I, access to the Joint MDC through the DIB, visualization capabilities through the use of an MFW and collaboration with the Army Battle Command System. In effect, V3 helped us transition from the crawl phase to the walk phase. Building on the successes of V3, the V4 PoC is accelerating us into the DCGS-A enterprise "run" phase.

The DCGS-A V4 PoC was built around two fundamental service-oriented components. The first was a fully developed Enterprise Service Bus (ESB) with a complementary business process management capability, and the second was a thin-client browser-based portal. An ESB is a loosely coupled, highly distributed and scalable integration infrastructure framework that connects, controls and mediates the interactions between applications. The ESB enables the objective DCGS-A V4

system to scale beyond the ingestion-based, hub-and-spoke-type V3 initial implementation. This is the ideal direction or infrastructure to grow or evolve from V3 and build V4. It was also consistent with the road map migration from walk to run. The DCGS-A V4 PoC, first demonstrated in the summer of 2006, integrated multiple POR capabilities making them visible through the use of the thin-client browser-based portal. DCGS-A V4, when delivered, will be an open and flexible ISR enterprise system that will support the current fight and be easily extended by recomposing or integrating new services as they become available or when required to meet the Future Force's needs.

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He is responsible for executive leadership, oversight, direction and total cost ownership for Army IEW&S modernization strategies and program capabilities. Bair holds a B.S. in industrial management from Purdue University, an M.S. in national resources strategy from the National Defense University and is a Defense Acquisition University Senior Acquisition Capstone Course graduate.